

AD-A144 545

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
BRADWAY DAM (CT 00480..(U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV FEB 81

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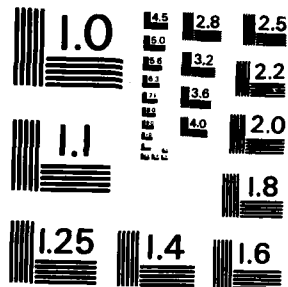
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AD-A144 545

THAMES RIVER BASIN
STAFFORD, CONNECTICUT

BRADWAY DAM

CT 00480

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00480	2. GOVT ACCESSION NO. AD A144 545	3. RECIPIENT'S CATALOG NUMBER
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Thames River Basin Stafford, Connecticut		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Bradway Dam consists of a 330 foot long earth embankment and a 140 foot wide grassed natural channel used as an emergency spillway. The maximum height of dam is 29 feet with a maximum storage capacity of 1,050 acre-feet at crest elevation. Therefore, the size classification is intermediate. The hazard classification is low. The Corps of Engineers Guidelines recommend a spillway design flood of 100 year to 1/2 PMF. Based on visual inspection Bradway Dam appears to be in very good condition.		

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No: CT 00480
Name of Dam: Bradway Dam
Town: Stafford
County and State: Tolland, Connecticut
Stream: Unnamed
Date of Inspection: 17, February, 1981

• BRIEF ASSESSMENT

Bradway Dam consists of a 330 foot long earth embankment and a 140 foot wide grassed natural channel used as an emergency spillway. The outlet consists of a concrete riser with 6 foot long weirs on each side and a 24-inch reinforced concrete outlet pipe discharging to an unnamed stream at the toe of dam.

Construction of this dam was completed except for seeding in 1960 for the Connecticut Department of Agriculture and National Resources (now the Department of Environmental Protection). The seeding was completed in 1961. The dam was constructed for the purpose of flood control. This dam and five others constructed during the same period control flooding in Stafford Springs from Middle River and Furnace Brook.

The maximum height of dam is 29 feet with a maximum storage capacity of 1,050 acre-feet at crest elevation. Therefore, the size classification is

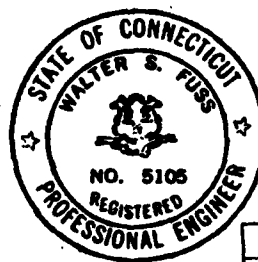
mediate. The area of probable dam failure impact encompasses a wooded area between the dam and Middle River approximately 6,300 feet downstream. There would be no damage to building or roads caused by a dam failure. The hazard classification is low.

The Corps of Engineers Guidelines recommend a spillway design flood of 100-year to 1/2 Probable Maximum Flood (PMF). The Soil Conservation Service design for this dam used a rainfall of 15 inches and a runoff of 14 inches for the emergency spillway design. This design flood is more than adequate for Bradway Dam.

Based on the visual inspection, Bradway Dam appears to be in very good condition. Maintenance practices at Bradway Dam appear to be very good. It is recommended that the owner continue present maintenance practices. There are no recommendations or remedial measures required at Bradway Dam.

FUSS & O'NEILL, INC.

By: Walter S. Fuss
Walter S. Fuss, P.E.
President



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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the

dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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OVERVIEW PHOTO

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
BRADWAY DAM CT 00480

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection through the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Fuss & O'Neill, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Fuss & O'Neill, Inc. under a letter of 25 November, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-81-C-0020 has been assigned by the Corps of Engineers for this work.
- b. Purpose
1. Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.
 2. Encourage and assist the States to initiate quickly effective dam safety programs for non-federal dams.

3. To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF PROJECT

- a. Location. Bradway Dam is located in the Town of Stafford, County of Tolland, State of Connecticut. The dam is located at Latitude 41°-57'-07" and Longitude 72°-21'-07". The structure impounds flow in an unnamed brook, with a 1.2 square mile watershed. Bradway Dam is located about 2,800 feet east of McClelland Road and 6,200 feet north of Connecticut Route 140.
- b. Description of Dam and Appurtenances. Bradway Dam is about 330 feet in length with a top width of 14 feet. The structure is an earth embankment with a maximum height of 29 feet. The upstream slope is 1.0 vertical to 3.0 horizontal and the downstream slope is 1.0 vertical to 2.0 horizontal.

The emergency spillway is grassed lined natural channel with a crest 4.5 feet below the top of dam. The spillway is located at the west end of the dam.

The principal spillway consists of a reinforced concrete riser with 6.0 foot weirs on each side, parallel to the stream flow. There is an 18 inch opening in the upstream face of the riser with the invert at the bottom of the approach channel. The outlet from the

riser is a 24-inch reinforced concrete water pipe which discharges to the natural channel downstream.

- c. Size Classification. The height of dam is 29 feet from crest of dam to bed of outlet channel and the total storage volume is 1,050 acre-feet. The dam is therefore classified as an INTERMEDIATE structure in accordance with the recommended guidelines of the Corps of Engineers.
- d. Hazard Classification. The dam is classified as having a low hazard potential because it is located in a rural area and the failure discharge will not cause damage to any buildings or roads.
- e. Ownership. The Bradway Dam is owned by the State of Connecticut and is maintained by the Department of Environmental Protection.
- f. Operator. Operating personnel are under the direction of:

John Spencer
Region 3 Director
Department of Environmental Protection
Marlborough, CT 06447
Telephone: (203) 295-9523
- g. Purpose of Dam. Bradway Dam is a flood control dam to reduce damage in Stafford Springs due to flooding from Furnace Brook and Middle River. Since this is essentially a dry dam, flood control is the only present use.

- h. Design and Construction History. The construction of this facility was completed in 1961. The dam was designed by the U.S. Department of Agriculture, Soil Conservation Service for the Connecticut Department of Agriculture and Natural Resources.
- i. Normal Operating Procedure. This facility is dry except during periods of storm flow. Water enters the outlet structure by passing over fixed weirs in the principle spillway riser. Therefore, operation is automatic.

1.3 PERTINENT DATA

- a. Drainage Area. Bradway Dam is located in Tolland County in northeastern Connecticut. The drainage basin has a maximum length of about 1.5 miles, a maximum width of about 1.0 miles and a total area of 1.2 square miles. The area is rolling with elevations from 680 and 880 feet and is rural. The time of concentration of this watershed is 3.03 hours. The watershed includes 0.3 square miles of existing pond and swamp.
- b. Discharge at Dam Site. There is no history of discharge data available for this dam. The following discharge data is as calculated by the Soil Conservation Service:

1. Outlet Works

Principal spillway is a 24-inch concrete pipe. Emergency spillway is 140 feet wide with a grass surface.

2. Maximum known flood at dam site

Unknown

3. Principal spillway capacity at test flood elevation of 692

70 cfs

4. Emergency spillway capacity at test flood elevation of 692

680 cfs

5. Principal spillway capacity at top of dam elevation 694

74 cfs

6. Emergency spillway capacity at top of dam elevation 694

3,000± cfs

7. Total project discharge capacity at top of dam elevation 694

3,074± cfs

8. Total project discharge at test flood elevation 692

750 cfs

c. Elevation (feet above N.G.V.D.)

1. Streambed at toe of dam

665

2. Bottom of cutoff

None

3. Maximum Tailwater

Unknown

4. Normal pool

None

5. Full flood control pool

692

6. Emergency spillway crest	690
7. Design surcharge	692
8. Top of dam	694
9. Test flood surcharge	692

d. Reservoir (Length in feet)

1. Normal pool	None
2. Flood control pool	3700'
3. Emergency spillway crest pool	2900'
4. Top of dam pool	4500'
5. Test flood pool	3700'

e. Storage (acre-feet)

1. Normal pool	None
2. Flood control pool	670
3. Emergency spillway crest pool	390
4. Top of dam pool	1050
5. Test flood pool	670

f. Reservoir Surface (acres)

1. Normal pool	None
2. Flood-control pool	168
3. Spillway crest	93
4. Test flood pool	168
5. Top of dam	214

g. Dam

1. Type	Earth Embankment
2. Length	330'
3. Height	29'
4. Top Width	14'
5. Side Slopes	Upstream 3H:1V Downstream 2H:1V
6. Zoning	None
7. Impervious Core	None
8. Cutoff	None
9. Grout Curtin	None

h. Diversion and Regulatory Tunnel

N/A

i. Spillway

Principal Spillway

1. Type	Concrete riser with side weirs and 24" concrete pipe outlet
2. Length of Weir	2 @ 6.0'=12'
3. Crest Elevation	683.0
4. Gates	None
5. U/S Channel	Natural Bed
6. D/S Channel	Natural Bed
7. Design Surchage	9.0 feet

Emergency Spillway

- | | |
|---------------------|-----------------------|
| 1. Type | Grass natural channel |
| 2. Length of Weir | 140' bottom width |
| 3. Crest Elevation | 690 |
| 4. Gates | None |
| 5. U/S Channel | Grass |
| 6. D/S Channel | Grass |
| 7. Design Surcharge | 2.0 feet |

j. Regulation Outlet N/A

SECTION 2 - ENGINEERING DATA

- 2.1 DESIGN DATA: Bradway Dam was designed by the United States Department of Agriculture, Soil Conservation Service for the Connecticut Department of Agriculture and Natural Resources. The design storm used was 15 inches of rainfall in 6 hours, which exceeds a 1/2 P.M.F. storm.
- 2.2 CONSTRUCTION DATA: The application "For Construction Permit For Dam" was dated November 25, 1959. The Construction Permit was approved on January 4, 1960 by the Connecticut Water Resources Commission. Construction was completed in 1961. A final inspection was held on October 20, 1961 by the Consultant to Water Resources Commission. A Certificate of Approval was issued November 9, 1961.
- 2.3 OPERATION DATA: Since this is basically a dry pool flood control dam with no recording instrumentation, there are no operation records available.
- 2.4 EVALUATION OF DATA:
- a. Availability. The Connecticut Department of Environmental Protection made their files available with limited design and construction information. Also, the Work Plan and Design Report was examined at the State Office of the Soil Conservation Service. Actual computations

have been stored in the National Archives of the Soil Conservation Service and are not easily available.

- b. Adequacy. Although the detailed design computations were not reviewed at this time, they were reviewed at the time of design by engineers under the direction of the Connecticut Water Resources Commission.
- c. Validity. There is no reason to question the validity of the available data.

have been stored in the National Archives of the Soil Conservation Service and are not easily available.

- b. Adequacy. Although the detailed design computations were not reviewed at this time, they were reviewed at the time of design by engineers under the direction of the Connecticut Water Resources Commission.
- c. Validity. There is no reason to question the validity of the available data.

c. Appurtenant Structures

1. Principal Spillway - The inlet to the principal spillway is shown in Photo No. C-4.

The pipe from the riser through the embankment to the outlet is a 24-inch reinforced concrete water pipe. The portion of the pipe that is visible is in good condition and is shown in Photo No. C-5.

2. Emergency Spillway - The emergency spillway is grass lined and is a natural channel northwest of the dam as shown in Photo No. C-6. There is a good mat of grass and the spillway is in good condition.

- d. Reservoir Area About 100 feet upstream of the dam there is an existing pond with a 6-foot high earth dam and concrete spillway as shown in Photo No. C-2. The area flooded by Bradway Dam other than the existing pond is a swampy area to the south of the pond and north of Sandy Beach Road (Conn. Route 140).

- e. Downstream Channel The downstream channel for Bradway Dam is an unnamed natural stream as shown on Photo No. C-3. The stream does not cross any roads before joining Middle River about 6300 feet downstream.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

- a. General. Based on the visual inspection and a review of the design criteria and construction plans, Bradway Dam and its appurtenances are judged to be in good condition.

The dam consists of an earth embankment and was constructed in conjunction with five other dams in the area for the purposed of flood control in the Borough of Stafford Springs and is a dry dam.

b. Dam.

1. Upstream Face - The upstream face is grass covered with a very dense mat on most of the surface. There are no trees growing on this slope which is shown in Photo No. C-2.
2. Crest - The crest is grass covered. It is relatively level with vehicle tracks, but no significant rutting.
3. Downstream Face - The downstream face is grass covered with a very dense mat and is shown in Photo No. C-3. The foundation drains appear to be functioning with minor flow at the time of the inspection. Outlets to the foundation drains are shown in Photo No. C-5.

3.2 EVALUATION: Based on visual inspection, the overall condition of the dam is very good and the maintenance program appears to be very good. There is no work required at Bradway Dam other than to continue the present maintenance program.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES:

- a. General. This dam is a flood control structure and the operation is automatic in that the flood water detention is accomplished by the fact that the principal spillway has a capacity less than the storm inflow.
- b. Description of Any Warning System in Effect. There are no emergency procedures established for evacuation downstream of the dam in effect.

4.2 MAINTENANCE PROCEDURES:

- a. General. This dam is checked for maintenance requirements two times per year and any required work is done at that time. Maintenance consists mainly of cutting grass and tree growth. Maintenance appears to be very good at this dam.
- b. Operating Facilities. There are no operating facilities at this dam.

4.3 EVALUATION: The existing maintenance schedule should be continued.

SECTION 5
EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

- 5.1 GENERAL: Bradway Dam consists of a 330 foot long earth dam with a maximum height of 29 feet. The principal spillway consists of a reinforced concrete riser with a 24-inch concrete pipe outfall. The emergency spillway is a natural grass channel with a maximum surcharge of 4.5 feet before overtopping the dam.

The structure impounds the flow in an unnamed stream. The watershed includes an existing pond and Devils Hopyard Swamp. The area is rolling and wooded around the swamp.

- 5.2 DESIGN DATA: Bradway Dam was designed by the Soil Conservation Service. The weighted curve number for the watershed was computed to be 67.23 for AMC II with a time of concentration of 3.03 hours.

The design flood used a rainfall of 15 inches in 6 hours. A total pre-precipitation loss of 1.0 inches resulted in a net runoff of 14.0 inches.

The drawdown time was calculated to be 3.26 days.

- 5.3 EXPERIENCE DATA: No historical data for recorded discharges or water surface elevations are available for this dam or watershed.

- 5.4 TEST FLOOD ANALYSIS: Recommended guidelines for the safety inspection of dams by the Corps of Engineers were used for the selec-

tion of the "Test Flood". Bradway Dam is classified as intermediate in size with a low hazard potential. Guidelines for these classifications indicate that a storm event equal in magnitude to a 100 year flood to 1/2 the Probable Maximum Flood should be used. The probable maximum rainfall for this area is 24 inches in 6 hours for 10 square miles. When designing this facility, the Soil Conservation Service used a 6-hour rainfall of 15 inches and a runoff of 14.0 inches. This storm exceeds the storm required.

The "test flood" was calculated to be 2,620 cfs. The peak outflow for the test flood inflow was computed to be 750 cfs by the Soil Conservation Service. This outflow results in a water surface elevation 2.0 feet below the crest of dam with a maximum depth of flow in the emergency spillway of 2.5 feet.

5.5 DAM FAILURE ANALYSIS: Applying the calculated dam failure discharge of 12,600 cfs when the impounded water level in the reservoir is at elevation 692.0 (Test Flood Surge) will produce a flood depth of 10.5 feet and an approximate water surface elevation of 675.5 just downstream of the dam. The depths of flow would range from 14.9 feet 1000 feet downstream of the dam to 3.7 feet approximately 7600 feet downstream.

This dam is classified as having a low hazard potential because a dam

failure would not cause damage to any buildings or roads.

Computations of water surface elevations and a map showing the limits of the impact area are included in Appendix D.

SECTION 6 - STRUCTURAL STABILITY

- 6.1 VISUAL OBSERVATION: The field inspection did not reveal any stability problems.
- 6.2 DESIGN AND CONSTRUCTION DATA: A review of the "As Built" drawings did not disclose any potential stability problems. It was assumed that the dam was constructed as shown on the drawings. The field inspection did not indicate any substantial variance from the plans.
- 6.3 POST CONSTRUCTION CHANGES: There are no post construction changes apparent.
- 6.4 SEISMIC STABILITY: Bradway Dam is located in Seismic Zone 1 and in accordance with the Corps of Engineers Guidelines, may be assumed to present no hazard from earthquake since the static stability conditions appear to be satisfactory.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT:

- a. Condition. Based on the visual inspection, Bradway Dam appears to be in good condition.
- b. Adequacy of Information. "As Built" drawings were made available for this report. The Work Plan and Design Report were available for examination at the Soil Conservation Service office. Actual design calculations were not available, but were reviewed by engineers for the Connecticut Water Resources Commission before construction was started.
- c. Urgency. There are no recommendations or remedial measures that require implementation.

7.2 RECOMMENDATIONS: There are no recommendations requiring additional engineering investigation or modifications to the dam.

7.3 REMEDIAL MEASURES:

- a. Operation and Maintenance Procedures. There are no remedial measures required.

7.4 ALTERNATIVES: There are no alternatives to the recommendations and remedial measures contained in Section 7.2 and 7.3.

APPENDIX A

INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Bradway Dam DATE 2/17/81
TIME 11:00 a.m.
WEATHER Clear 50°
W.S. Elev. 671.2 U.S. 665.0 DN.S.

PARTY:

1. Glenn Mirtl, Hydrology & Hydraulics
2. C. Welti, Soils & Geology
3. E. Lang, Structural & Mechanical
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

<u>PROJECT FEATURE</u>	<u>INSPECTED BY</u>	<u>REMARKS</u>
1. _____		
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT</u>	
Crest Elevation	694.0
Current Pool Elevation	None
Maximum Impoundment to Date	Unknown
Surface Cracks	None Visible
Pavement Condition	No pavement, grass covered crest
Movement or Settlement of Crest	None apparent
Lateral Movement	None apparent
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	Not applicable (n/a)

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT (cont)</u>	
Trespassing on Slopes	None
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	N/A
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	None
Piping or Boils	None
Foundation Drainage Features	Appear to be functioning - no flow
Toe Drains	Good
Instrumentation System	N/A
Vegetation	Very good grass cover, no trees
A-3	

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	100' from existing pond to inlet structures
Slope Conditions	Good
Bottom Conditions	Good
Rock Slides or Falls	None
Log Boom	N/A
Debris	None
Condition of Concrete Lining	N/A
Drains or Weep Holes	N/A
b. Intake Structure	
Condition of Concrete	Good
Stop Logs and Slots	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81
 PROJECT FEATURE _____ NAME _____
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	Concrete pipe principal = spillway outlet
General Condition of Concrete	Good
Rust or Staining on Concrete	None
Spalling	None
Erosion or Cavitation	None
Cracking	None
Alignment of Monoliths	N/A
Alignment of Joints	N/A
Numbering of Monoliths	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	N/A
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
A-6	

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u> (cont)	N/A
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	
A-7	

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	
General Condition of Concrete	Pipe
Rust or Staining	None
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None
Condition at Joints	N/A
Drain Holes	N/A
Channel	Good
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	Emergency Spillway
a. Approach Channel	Small trees along existing pond
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Good
b. Weir and Training Walls	N/A
General Condition of Concrete	
Rust or Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
b. Weir and Training Walls	N/A
Drain Holes	
c. Discharge Channel	Heavy tree growth in natural area
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Natural growth
Floor of Channel	Good
Other Obstructions	None
A-10	

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	N/A
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	

PERIODIC INSPECTION CHECK LIST

PROJECT Bradway Dam DATE 2/17/81

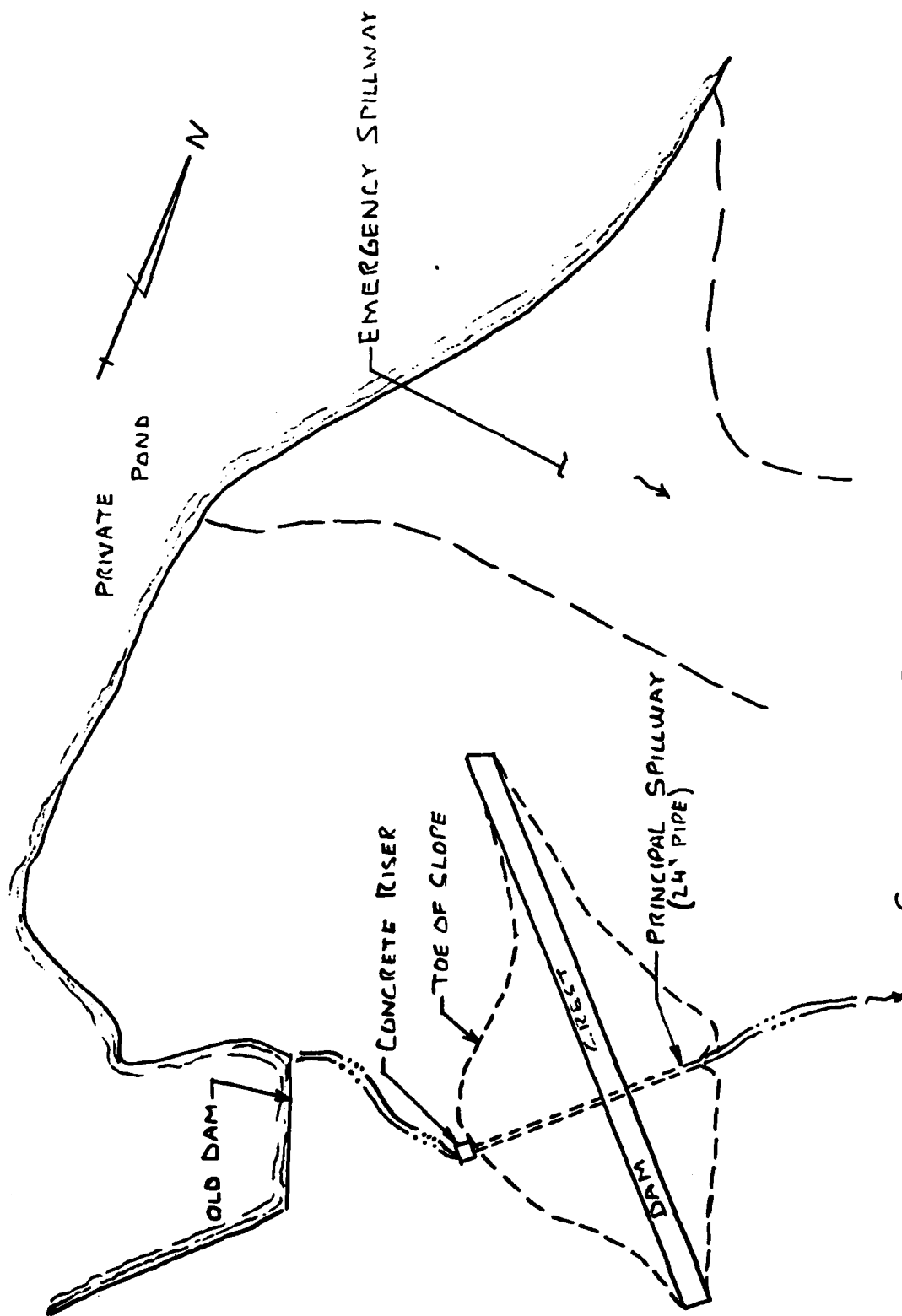
PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u> (cont)	N/A
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	
A-12	

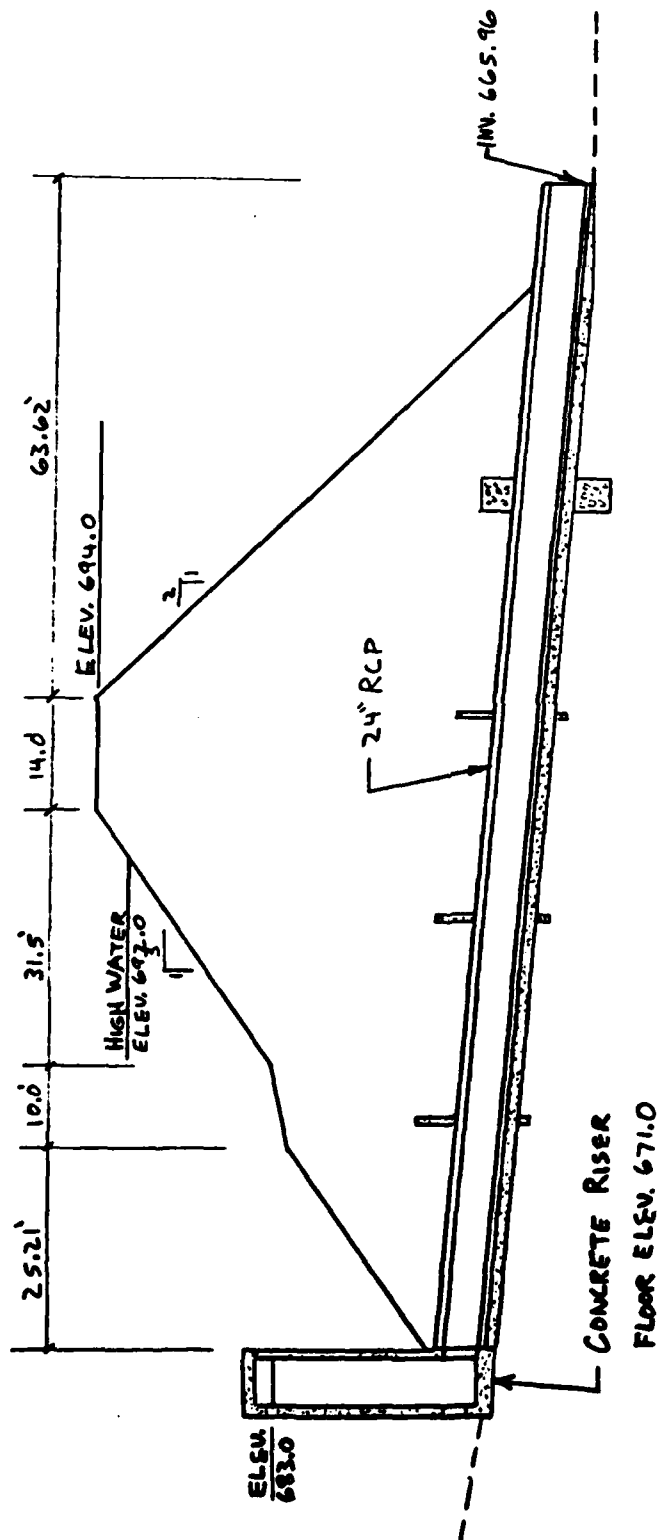
APPENDIX B

ENGINEERING DATA



GENERAL PLAN
SCALE: 1" = 80' ±

BRADWAY DAM



PROFILE ALONG & OF PRINCIPAL SPILLWAY

BRADWAY DAM

No. _____

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried
By _____

Date _____

4 23
CT 480

Name of Dam or Pond Bradway SCS Dam #4

Code No. W 24.0 MR 2.4 ED 0.8 U 1.2

Nearest Street Location HOPKINSON ROAD

Town Stafford

U.S.G.S. Quad. STAFFORD SPRINGS

LAT. 41° 57.2'

Name of Stream trib to Edison Br.

LONG. 72° 21.2'

Owner State Comm of Agric - DEP

Address HARTFORD CT

Pond Used For FLOOD CONTROL

Dimensions of Pond: Width _____ Length _____ Area 213.5 AC

Total Length of Dam 180' Length of Spillway 150'

Location of Spillway SPILLWAY - CENTER OF DAM: EMB. - LEFT ABUTMENT

Height of Pond Above Stream Bed 30' 28'

Height of Embankment Above Spillway 5' 2'

Type of Spillway Construction PRINCIPAL SPILL 24' CONC PIPE EMB. OVER

Type of Dike Construction EARTH FILL

Downstream Conditions Village

Summary of File Data Approved No. 61

Remarks FLOODWATER DETENTION CAPACITY 392.0 AC-ft

TOTAL RESERVOIR CAPACITY 1049.0 AC-ft

STRUCTURE HEIGHT 27 FT

1961

11/15

CLASS 5 according to Manual

JOHN J. MOZZOCHI AND ASSOCIATES
CONSULTING ENGINEERS

JOHN J. MOZZOCHI

ASSOCIATES

OWEN J. WHITE
JOHN LUCHE, JR.

December 11, 1959

217 HEBRON AVENUE
GLASTONBURY, CONN.
PHONE MEDFORD 3-9401

William S. Wise - Director
State Water Resources Commission
State Office Building
Hartford 15, Connecticut

RECEIVED

DEC 14 1959

Re: Our File 57-73-19-4
Stafford Springs
Detention Reservoirs
Site No. 4 - Bradway

State Water Resources Commission

Dear Mr. Wise:

In accordance with your authorization dated August 28, 1958, I have reviewed the design of the referenced project submitted for approval by the State Department of Agriculture.

Design criteria established in letter dated April 30, 1959 from Mr. Charles J. Pelletier, Hydraulic Engineer, are tabulated herewith for comparison with actual design data.

	<u>Design Data</u>	<u>Criteria</u>
Drainage Area	1.20 sq. mi	
Design Storm	15" in 6 hrs.	15" in 6 hrs
Total Retention	1"	1.5"
Net Run-off	14"	13.5"
Design Peak	2620 cfs	
Per Sq. Mile	2180 cfs	
Drawdown Time	3.26 days	0-5 days
Earth Spillway Discharge	680 cfs	
Earth Spillway Width	min. 75'	
Dc at Control Section	1.27'	
Vc at Control Section	5.7 fps	9 fps
Velocity in Exit Channel	4.8 fps	9 fps
Freeboard	2.0'	2.0' min.


All of the design data computations have been checked and we find them to be substantially correct. As shown in the above listing the design meets the criteria established in all instances.

We have discussed with the S.C.S. engineers the desirability of berming the entrance to an auxiliary channel, which branches off from the main channel. This berm will tend to eliminate the tendency of flow from this auxiliary channel towards the toe of the dam. They have agreed to provide for this berm on their plans prior to releasing them for contract bidding.

I therefore recommend that a construction permit be issued for this project with the proviso, that this change on the plans be made.

We are retaining the copy of the design report, plans and specifications for future reference.

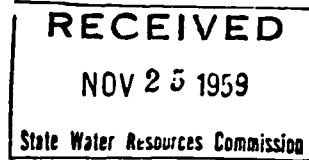
Very truly yours,


John J. Mozzochi and Associates
Consulting Engineers

IJM:hk

FORM D-4

STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
Room 317, State Office Building
Hartford, Connecticut



APPLICATION FOR CONSTRUCTION PERMIT FOR DAM

Owner State of Connecticut Date Nov. 25, 1959

P. O. Address Conn. Dept. of Agriculture, Conservation & Natural Resources
State Office Bldg. Hartford Tel. No. JA76341 - Ext. 435

Location of Structure:

Town Stafford Shown on USGS Quadrangle Stafford Springs, Con
Name of Stream Bradway Pond Brook at _____ inches south of Lat. _____
north
and _____ inches east of Long. _____
west

Directions for reaching site from nearest village or route intersection:
(see sketch on reverse side)

Howard Road, Stafford

This is an application for: ☒ (New Construction) ☐ (Alteration) ☐ (Repair) ☐ (Removal)
(check one or more of above)

This pond is to be used for: Flood Control

Dimensions of Pond: width _____ length _____ area _____

Maximum depth of water immediately above dam: _____

Total length of dam: S

Length of spillway: E

Height of abutments above spillway: L

Type of spillway construction: N

Type of dike construction: S

Spillway section will be set on: (Bedrock) (Gravel) (Clay) (Till)
(check one of above)

Remarks: _____

Signed: Joseph n Hill

(owner)

Name of Engineer, if any USDA

Note: Show details of
construction on reverse side.

STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
Room 317, State Office Building
Hartford, Connecticut

CONSTRUCTION PERMIT FOR DAM

Date: Jan. 4, 1960

To: State Of Connecticut

Department of Agriculture, Conservation & Natural Resources

State Office Building

Hartford, Connecticut
Gentlemen:

Attention: Mr. Joseph W. Gill, Commissioner

Your application for Construction Permit dated Nov. 25, 1959,
for the construction of an earth dam on Bradway Pond Brook in the Town
of Stafford in accordance with plans and specifications marked CN-405
and prepared by the Soil Conservation Service, U.S. Dept. of Agriculture.
copy of which is attached hereto, has been considered and the
construction described therein is hereby approved only under the
following conditions:

1. The Commission shall be notified

- A) When construction is started
- B) When foundation is excavated
- C) When the dam is completed and before water is impounded
- D) When project is completed and ready for final inspection

- 2. That the entrance to an auxiliary channel, which branches off
- 3. from the main channel, will be bermed as discussed with S.C.S.
- 4. engineers and that such berm will be shown on the plans prior to
- 5. releasing them for contract bidding.

This permit, with the attached application form and other
enclosures, must be kept at the site of the work and made available to
the Commission at any time during the construction. This permit covers
the construction as described in the attached documents. If any changes
are contemplated the Commission must be notified and supplementary
approval obtained.

If the construction authorized by this construction permit is not started within two years of the date of this permit and completed within four years of the same date this permit must be renewed.

Your attention is directed to Section 25-115 of the 1958 Revision to the General Statutes - Liability of owner or operator. Nothing in this chapter, and no order, approval or advice of the commission or a member thereof, shall relieve any owner or operator of such a structure from his legal duties, obligations and liabilities resulting from such ownership or operation. No action for damages sustained through the partial or total failure of any structure or its maintenance shall be brought or maintained against the state, a member of the commission or the commission, or its employees or agents, by reason of supervision of such structure exercised by the commission under this chapter.

The Commission cannot convey or waive any property right in any lands of the state, nor is this permit to be construed as giving any property rights in real estate or material or any exclusive privileges, nor does it authorize any injury to private property or the invasion of private rights or any infringement of federal, state or local laws or regulations.

Your attention is also directed to Section 26-134 of the 1958 Revision to the General Statutes - Obstructing streams. No person shall, unless authorized by the director, prevent the passing of fish in any stream or through the outlet or inlet of any pond or stream by means of any rack, screen, weir or other obstruction or fail, within ten days after service upon him of a copy of an order issued by the director, to remove such obstruct. - - - -The address of the State Board of Fisheries and Game is 2 Wethersfield Avenue, Hartford 15, Connecticut.

Very truly yours,

By: William S. Wise
William S. Wise
Director

WSW/jt Encls.

cc: Town Clerk, Stafford
Mr. Sam Smith, Soil Conservation Service
Mr. John J. Monzochi

Wm O'Brien WRL

pen memo D0180 Jan 12, 1970

S. Bradley Pond Bk. Dam
Site # 4
Stafford

FORM D-7

STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
Room 317, State Office Building
Hartford, Connecticut

CERTIFICATE OF APPROVAL

Date November 9, 1961

To: State of Connecticut
Department of Agriculture and
Natural Resources
State Office Building
Hartford, Connecticut

ATTENTION: MR. JOSEPH N. GILL,
COMMISSIONER

NAME OF STRUCTURE: Bradley Pond Brook Dam, Site #4, Stafford

This is to certify that the following construction work:

the construction of an earth dam in accordance with plans and
specifications marked C-105 and prepared by the Soil Conservation
Service, U. S. Department of Agriculture

on your property on Bradley Pond Brook

in the Town (s) of Stafford

for which construction permit was issued January 4, 1960, has been
completed to the satisfaction of this Commission and that such structure
is approved as of date of this Certificate.

cc: Soil Conservation
Service

WATER RESOURCES COMMISSION

BY:

William S. Wise
William S. Wise, Director

Note: The owner is required by law to record this Certificate in the
land records of the town or towns in which the dam, dike or similar
structure is located.

APPENDIX C

PHOTOGRAPHS

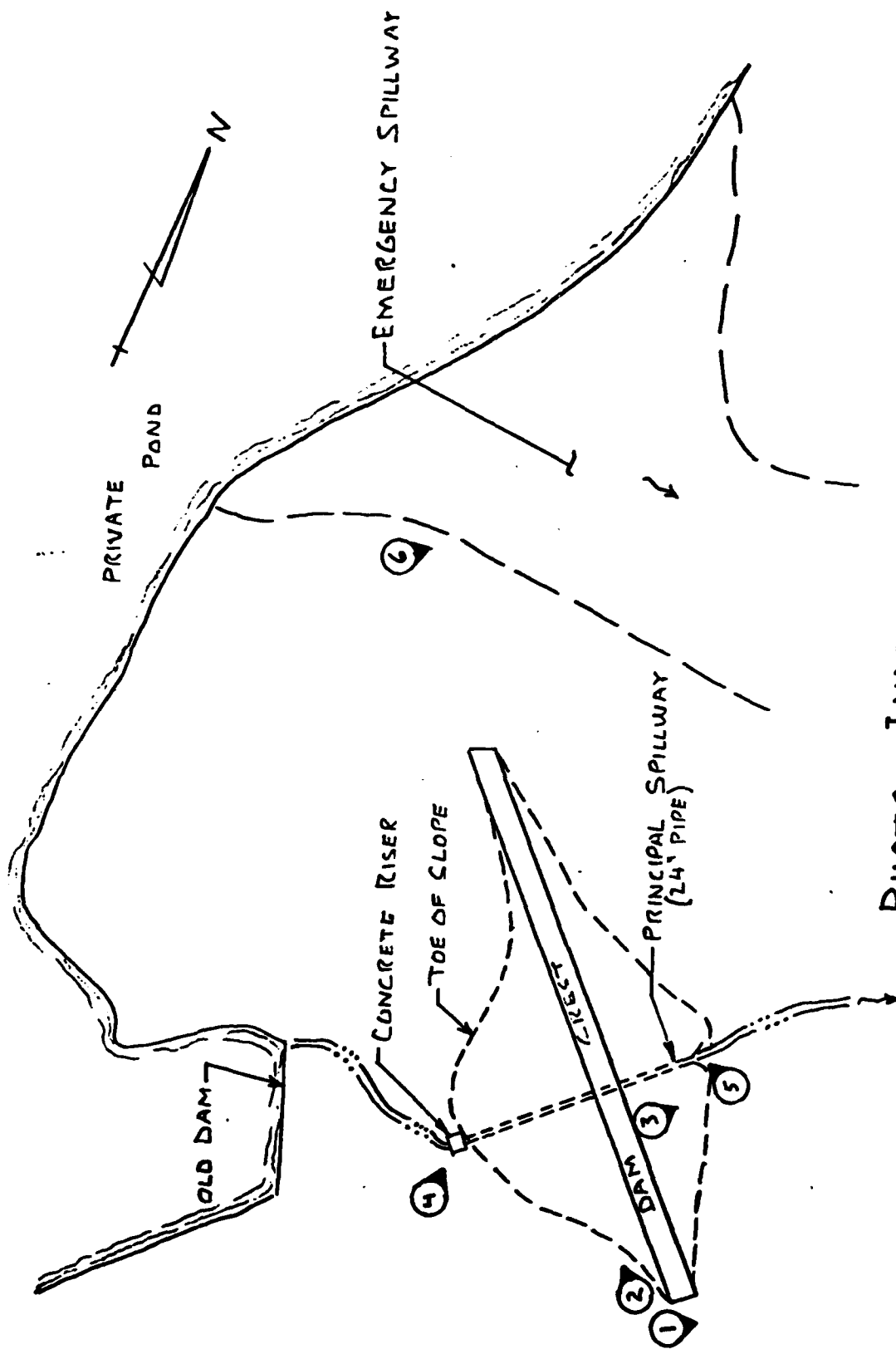
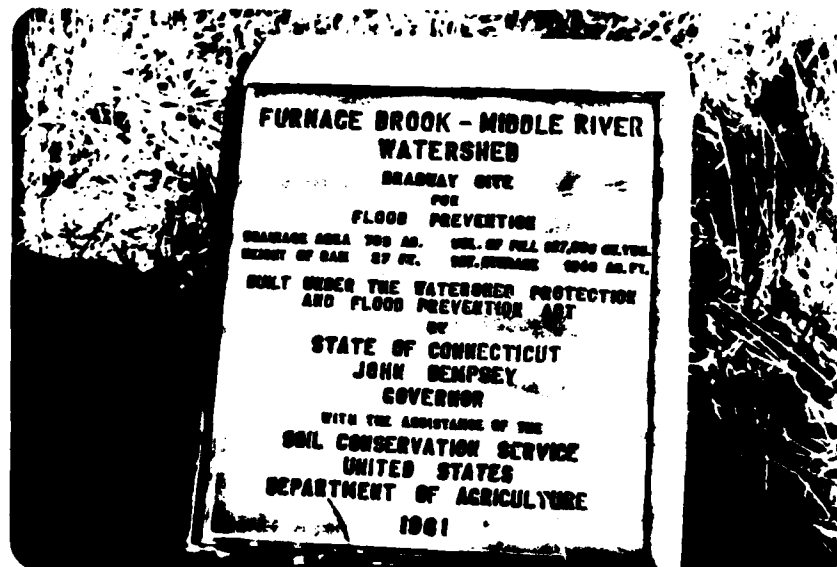


PHOTO INDEX
SCALE: 1" = 80'

BRADWAY DAM



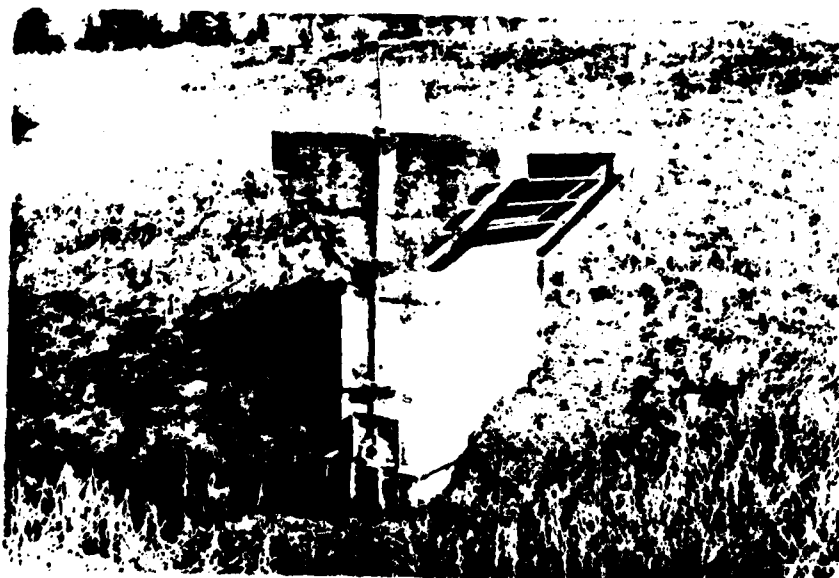
C-1 IDENTIFYING MONUMENT



C-2 UPSTREAM SLOPE



C-3 DOWNSTREAM SLOPE



C-4 PRINCIPAL SPILLWAY INLET STRUCTURE



C-5 PRINCIPAL SPILLWAY OUTLET



C-6 EMERGENCY SPILLWAY

APPENDIX D

HYDROLOGIC AND HYDRAULIC
COMPUTATIONS







FUSS & O'NEILL
consulting engineers

PREPARED
BY
GJM

DATE
3/15/81

CHECKED
BY

DATE

PROJECT N
80-157

SUBJECT: Dam Failure Hydrograph - Broadway Dam

SHEET NO.
1 of 9

STAGE-DISCHARGE RATINGS

<u>STATION</u>	<u>SLOPE</u>	<u>n</u>	<u>ELEV.</u>	<u>AREA</u>	<u>P</u>	<u>Q</u>
0+0	3.0%	.040	675	550	110	10,500
			680	1275	170	31,800
			690	3500	285	121,100
5+0	14.0%	.100	625	370	75	5,400
			630	750	150	11,000
			635	1680	220	32,600
10+0	3.8%	.100	600	500	100	4,300
			605	1110	150	13,400
15+0	2.7%	.100	580	1050	180	8,400
			585	2100	250	21,300
20+0	0.96%	.100	575	2600	500	11,500
			580	5600	700	32,900
25+0	0.96%	.100	570	1570	350	6,300
			575	3920	580	20,600
30+0	7.7%	.100	550	1000	250	10,500
			555	2800	470	38,300
35+0	2.5%	.100	526	470	270	1,600
			530	2250	600	12,900
40+0	1.1%	.080	520	1800	600	7,400
			525	5050	700	37,100



FUSS & O'NEILL
consulting engineers

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BY
GJM

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3/15/81

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BY

DATE

PROJECT

80-157

SUBJECT: Dam Failure Hydrograph - Broadway Dam

SHEET NO
2 of 9

STAGE-DISCHARGE RATINGS

<u>STATION</u>	<u>SLOPE</u>	<u>n</u>	<u>ELEV.</u>	<u>AREA</u>	<u>P</u>	<u>Q</u>
50+0	0.375%	.080	510	140	140	200
			515	1020	220	3,300
			520	2270	290	10,300
60+0	0.375%	.080	510	1200	400	2,900
			515	4880	830	18,300
66+0	0.36%	.040	505	100	110	200
			510	1650	480	8,500
			515	5400	840	42,000
76+0	0.36%	.050	505	2650	930	9,600
			510	9480	1800	51,700



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3/12/81

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BY

DATE

PROJECT N

80-157

SUBJECT: Dam Failure Hydrograph - Broadway Dam

SHEET NO.
3 of 9

Storage = $S = 670 \text{ Ac. Ft.}$

Test Flood Pool Elevation = 692.0

Riverbed Elev. at Sta. 0+70 (4 Dam = 0+0) = 665

Dam Length at Mid Height = 120

Use Breach Width = $W_b = 120 \times .4 = 48'$

$Y_0 = 29'$

$$Q_{D1} = \frac{8}{27} W_b \sqrt{g} Y_0^{3/2} \\ = 12,600 \text{ cfs}$$

STA. 0+70

Stage = 675.5

Area = 620 S.F.

Vol. = 1 Ac. Ft.

$$Q_{D2} \text{ Trial} = 12,600 \left(1 - \frac{1}{670}\right) = 12,600 \text{ cfs}$$

$$Q_{D2} = 12,600 \text{ cfs}$$

Depth = 10.5'



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DATE
3/3/81

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BY

DATE

PROJECT N

80-157

SUBJECT: Dam Failure Hydrography - Broadway

SHEET NO.
4 of 9

STA. 5+0

$$Q_{p2} = 12,400 \text{ cfs}$$
$$\text{Stream bed Elev.} = 619$$
$$S = 670 - 1 = 669 \text{ A.C.F.}$$

$$\text{Stage} = 630.4$$
$$\text{Area} = 820 \text{ S.F.}$$
$$\text{Vol.} = 8 \text{ A.C.F.}$$

$$Q_{p3} \text{ Thiel} = 12,400 \left(1 - \frac{8}{669}\right) = 12,400 \text{ cfs}$$

$$\text{Stage} = 630.3$$
$$\text{Area} = 810 \text{ S.F.}$$
$$\text{Vol.} = 8$$

$$Q_{p3} = 12,400 \text{ cfs}$$

$$\text{Stage} = 630.3$$

$$\text{Depth} = 11.3$$

STA. 10+0

$$Q_{p3} = 12,400 \text{ cfs}$$
$$\text{Stream bed Elev.} = 590$$
$$S = 669 - 9 = 661 \text{ A.C.F.}$$

$$\text{Stage} = 605.0$$
$$\text{Area} = 1110 \text{ S.F.}$$
$$\text{Vol.} = 13 \text{ A.C.F.}$$

$$Q_{p4} \text{ Thiel} = 12,400 \left(1 - \frac{13}{661}\right) = 12,200$$

$$\text{Stage} = 604.9$$
$$\text{Area} = 1090 \text{ S.F.}$$
$$\text{Vol.} = 13 \text{ A.C.F.}$$

$$Q_{p4} = 12,200$$

$$\text{Stage} = 604.9$$

$$\text{Depth} = 14.9$$



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PROJECT N

80-157

SUBJECT: Dam Failure Hydrograph - Bradway

SHEET NO.
5 of 9

STA. 15+0

$Q_{p4} = 12,200 \text{ cfs}$
Stream bed Elev = 574
 $S = 66.1 - 13 = 648 \text{ Ac. Ft.}$

Stage = 581.5
Area = 1360 S.F.
Vol. = 16 Ac. Ft.

$Q_{p5} \text{ Trial} = 12,200 \left(1 - \frac{16}{648}\right) = 11,900 \text{ cfs}$

Stage = 581.4
Area = 1330 S.F.
Vol. = 15 Ac. Ft.

$Q_{p5} = 12,200 \left(1 - \frac{15}{648}\right) = 11,900 \text{ cfs}$

Stage = 581.4

Depth = 7.4'

STA. 20+0

$Q_{p5} = 11,900 \text{ cfs}$
Stream bed Elev = 566
 $S = 648 - 16 = 632 \text{ Ac. Ft.}$

Stage = 575.1
Area = 2660 S.F.
Vol. = 31 Ac. Ft.

$Q_{p6} \text{ Trial} = 11,900 \left(1 - \frac{31}{632}\right) = 11,300 \text{ cfs}$

Stage = 575.2
Area = 2710
Vol. = 31 Ac. Ft.

$Q_{p6} = 11,300$

Stage = 575.2

Depth = 9.2'



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3/15/81

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BY

DATE

PROJECT

80-157

SUBJECT: Dam Failure Hydrograph - Bradway

SHEET NO
6 of 9

STA. 25+0

$$Q_{p6} = 11,300 \text{ cfs}$$
$$\text{Stream bed Elev.} = 561$$
$$S = 632 - 31 = 601 \text{ Ac. Ft.}$$

$$\text{Stage} = 571.7$$
$$\text{Area} = 2390 \text{ S.F.}$$
$$\text{Vol.} = 27 \text{ Ac. Ft.}$$

$$Q_{p7} \text{ Trial} = 11,300 \left(1 - \frac{27}{601}\right) = 10,800 \text{ cfs}$$

$$\text{Stage} = 571.6$$
$$\text{Area} = 2310 \text{ S.F.}$$
$$\text{Vol.} = 27 \text{ Ac. Ft.}$$

$$Q_{p7} = 10,800 \text{ cfs}$$

$$\text{Stage} = 571.6$$

$$\text{Depth} = 10.6$$

STA. 30+0

$$Q_{p7} = 10,800 \text{ cfs}$$
$$\text{Stream bed Elev.} = 542$$
$$S = 601 - 27 = 574 \text{ Ac. Ft.}$$

$$\text{Stage} = 550.1$$
$$\text{Area} = 1020 \text{ S.F.}$$
$$\text{Vol.} = 12 \text{ Ac. Ft.}$$

$$Q_{p8} \text{ Trial} = 10,800 \left(1 - \frac{12}{574}\right) = 10,600 \text{ cfs}$$

$$\text{Stage} = 550.0$$
$$\text{Area} = 1000 \text{ S.F.}$$
$$\text{Vol.} = 11 \text{ Ac. Ft.}$$

$$Q_{p8} = 10,800 \left(1 - \frac{12}{574}\right) = 10,600 \text{ cfs}$$

$$\text{Stage} = 550.0$$

$$\text{Depth} = 8.0'$$



FUSS & O'NEILL
consulting engineers

PREPARED
BY
GJM

DATE
3/15/81

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BY

DATE

PROJECT

80-15

SUBJECT: Dam Failure Hydrograph - Broadway

SHEET N
7 of 9

STA. 35+0

$$Q_{p8} = 10,800 \text{ cfs}$$
$$\text{Streambed Elev.} = 522.5$$
$$S = 574 - 12 = 562 \text{ Ac Ft}$$

$$\text{Stage} = 530$$
$$\text{Area} = 1820 \text{ S.F.}$$
$$\text{Vol.} = 22 \text{ Ac Ft}$$

$$Q_{p9} \text{ Trial} = 10,800 \left(1 - \frac{22}{562}\right) = 10,400 \text{ cfs}$$

$$\text{Stage} = 529.1$$
$$\text{Area} = 1860 \text{ S.F.}$$
$$\text{Vol.} = 21 \text{ Ac Ft}$$

$$Q_{p9} = 10,800 \left(1 - \frac{21}{562}\right) = 10,400 \text{ cfs}$$

$$\text{Stage} = 529.1$$

$$\text{Depth} = 6.6'$$

STA. 40+0

$$Q_{p9} = 10,400 \text{ cfs}$$
$$\text{Streambed Elev.} = 514$$
$$S = 562 + 22 = 540 \text{ Ac Ft}$$

$$\text{Stage} = 520.5$$
$$\text{Area} = 2130 \text{ S.F.}$$
$$\text{Vol.} = 24 \text{ Ac Ft}$$

$$Q_{p10} \text{ Trial} = 10,400 \left(1 - \frac{24}{540}\right) = 9,900 \text{ cfs}$$

$$\text{Stage} = 520.4$$
$$\text{Area} = 2070 \text{ S.F.}$$
$$\text{Vol.} = 24 \text{ Ac Ft}$$

$$Q_{p10} = 9,900 \text{ cfs}$$

$$\text{Stage} = 520.4$$

$$\text{Depth} = 6.4'$$



FUSS & O'NEILL
consulting engineers

PREPARED
BY
GJM

DATE
3/15/81

CHECKED
BY

DATE

PROJECT

80-15

SUBJECT: Dam Failure Hydrography - Bradway Dam

SHEET 1
8 of 9

STA. 50+0

$$Q_{p10} = 9900 \text{ cfs}$$
$$\text{Stream bed Elevation} = 508$$
$$S = 540 - 24 = 516 \text{ ACFH}$$

$$\text{Stage} = 519.7$$
$$\text{Area} = 2200 \text{ S.F.}$$
$$\text{Vol.} = 51 \text{ ACFH}$$

$$Q_{p11} \text{ Trial} = 9900 \left(1 - \frac{51}{516}\right) = 8900 \text{ cfs}$$

$$\text{Stage} = 519.0$$
$$\text{Area} = 2020$$
$$\text{Vol.} = 46 \text{ ACFH}$$

$$Q_{p11} = 9900 \left(1 - \frac{46}{516}\right) = 9000 \text{ cfs}$$

$$\text{Stage} = 519.1$$

$$\text{Depth} = 11.1$$

STA. 60+0

$$Q_{p12} = 9000 \text{ cfs}$$
$$\text{Stream bed Elevation} = 504$$
$$S = 516 - 49 = 467 \text{ ACFH}$$

$$\text{Stage} = 512.0$$
$$\text{Area} = 2460$$
$$\text{Vol.} = 61 \text{ ACFH}$$

$$Q_{p12} \text{ Trial} = 9000 \left(1 - \frac{61}{467}\right) = 7800 \text{ cfs}$$

$$\text{Stage} = 511.6$$
$$\text{Area} = 1170 \text{ S.F.}$$
$$\text{Vol.} = 27 \text{ ACFH}$$

$$Q_{p12} = 9000 \left(1 - \frac{27}{467}\right) = 8200$$

$$\text{Stage} = 511.7$$

$$\text{Depth} = 7.7$$



FUSS & O'NEILL
consulting engineers

PREPARED
BY

GJM

DATE

3/15/81

CHECKED
BY

DATE

PROJECT

80-15

SUBJECT: Dam Failure Hydrography - Broadway Dam

SHEET N

9 OF 9

STA. 66+0

$$Q_{P12} = 8,200 \text{ cfs}$$
$$S_{streambed} \text{ Elev.} = 503.2$$
$$S = 467.44 = 423 \text{ AC FT}$$

$$\text{Stage} = 509.7$$
$$\text{Area} = 1590 \text{ S.F.}$$
$$\text{Vol.} = 22 \text{ AC FT}$$

$$Q_{PB} \text{ Thiel} = 8200 \left(1 - \frac{22}{423}\right) = 7800 \text{ cfs}$$

$$\text{Stage} = 509.6$$
$$\text{Area} = 1520 \text{ S.F.}$$
$$\text{Vol.} = 21 \text{ AC FT}$$

$$Q_{PB} = 8200 \left(1 - \frac{22}{423}\right) = 7800 \text{ cfs}$$

$$\text{Stage} = 509.6$$

$$\text{Depth} = 6.4'$$

STA. 76+0

$$Q_{PB} = 7800 \text{ cfs}$$
$$S_{streambed} \text{ Elev.} = 499.9$$
$$S = 423 - 22 = 401 \text{ AC FT}$$

$$\text{Stage} = 504.1$$
$$\text{Area} = 2150 \text{ S.F.}$$
$$\text{Vol.} = 49 \text{ AC FT}$$

$$Q_{PB} \text{ Thiel} = 7800 \left(1 - \frac{49}{401}\right) = 6800 \text{ cfs}$$

$$\text{Stage} = 503.5$$
$$\text{Area} = 1880 \text{ S.F.}$$
$$\text{Vol.} = 43 \text{ AC FT}$$

$$Q_{PB} = 7800 \left(1 - \frac{49}{401}\right) = 6900 \text{ cfs}$$

$$\text{Stage} = 503.6$$

$$\text{Depth} = 3.7'$$

APPENDIX E

INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS

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